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- (71) Applicant: APPLIED MATERIALS, INC. [US/US]; (88) Date of publication of the international search report:  
P.O. Box 450A, Santa Clara, CA 95052 (US). 31 January 2002
- (72) Inventors: HOFFMAN, Daniel, J.; 12343 Arroyo de Arguello, Saratoga, CA 95070 (US); YIN, Gerald, Zheyao; 5511 Country Club Parkway, San Jose, CA 95138 (US). For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



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(54) Title: PLASMA REACTOR WITH OVERHEAD RF ELECTRODE TUNED TO THE PLASMA

(57) Abstract: In accordance with one aspect of the invention, a plasma reactor has a capacitive electrode driven by an RF power source, and the electrode capacitance is matched at the desired plasma density and RF source frequency to the negative capacitance of the plasma, to provide an electrode plasma resonance supportive of a broad process window within which the plasma may be sustained.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/08882

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01J37/32

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01J H05H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, A	US 6 162 709 A (RAOUX SEBASTIEN ET AL) 19 December 2000 (2000-12-19) column 6, line 10 - column 10, line 7 column 16, line 66 - column 18, line 58; figures 1,5 & WO 99 28524 A (APPLIED MATERIALS INC) 10 June 1999 (1999-06-10)	1,37,41, 64,73,89
A	US 5 077 499 A (OKU KOUJI) 31 December 1991 (1991-12-31) abstract; figures	1,37,41, 64,73,89
A	US 5 705 019 A (YAMADA MINORU ET AL) 6 January 1998 (1998-01-06) the whole document	1,37,41, 64,73,89

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl.  
Fax: (+31-70) 340-3016

Authorized officer

Schaub, G

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6162709	A	19-12-2000	US 6041734 A WO 9928524 A1	28-03-2000 10-06-1999
US 5077499	A	31-12-1991	JP 4000901 A DE 4112590 A1	06-01-1992 24-10-1991
US 5705019	A	06-01-1998	JP 2956494 B2 JP 8124862 A	04-10-1999 17-05-1996

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